

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A ~~frame synchronization apparatus and method for an~~
apparatus receiving ~~[[using]]~~ an optimal pilot pattern, comprising the steps of:

storing column sequences demodulated and inputted by slots, in a frame unit, in
detecting at least one of channel estimation and frame synchronization for at least one of
upward and downward link channels;

converting the stored column sequences according to a pattern characteristic
related to each sequence by using the pattern characteristic obtained from the relation between
the column sequences;

adding the converted column sequences by slots; and

performing a correlation process of the added result to a previously designated
code column.

2. (Currently Amended) The method as claim 1, wherein said converting step
comprises ~~the steps of~~ shifting, reversing and inverting the single column sequence to thereby
generate the remaining column sequences.

3. (Currently Amended) ~~A frame synchronization~~ An apparatus ~~[[using]]~~ recieving
an optimal pilot pattern comprising:

a memory mapping/addressing block for converting column sequences
inputted/demodulated by slots according to a defined pattern characteristic based on a relation
between the column sequences;

an adder for adding the converted outputs from the memory mapping/addressing
block; and

a correlator for performing a correlation process of the added result to a
previously designated code column.

4. (New) The method of claim 1, wherein the relation is based on the following:

$$\sum_{i=1}^{\alpha} R_{c_i}(\tau) = \begin{cases} \alpha \cdot 15, & \tau = 1 \\ -\alpha, & \tau \neq 0 \end{cases}$$

where $\alpha = 1, 2, 3, \dots, 8$ and $R_{c_i}(\tau)$ represents self correlation functions of each pilot
sequence C_i , and $i \geq 1$.

5. (New) The method of claim 4, wherein the relation is further based on the following:

$$\sum_{i=1}^{\alpha/2} [R_{C_{2i-1}, C_{2i}}(\tau) + R_{C_{2i}, C_{2i-1}}(\tau+1)] = \begin{cases} -\alpha \cdot 15, \tau = 7 \\ \alpha, \tau \neq 7 \end{cases}$$

where $\alpha = 2, 4, 6, 8$ and $R_{C_i, C_j}(\tau)$ represents a cross-correlation function between a pair of code sequences in each class, and $i \geq 1$.

6. (New) The method of claim 4, wherein $2 \leq i \leq 8$.

7. (New) The apparatus of claim 3, wherein the relation is based on the following:

$$\sum_{i=1}^{\alpha} R_{C_i}(\tau) = \begin{cases} \alpha \cdot 15, \tau = 1 \\ -\alpha, \tau \neq 0 \end{cases}$$

where $\alpha = 1, 2, 3, \dots, 8$ and $R_{C_i}(\tau)$ represents self correlation functions of each pilot sequence C_i , and $i \geq 1$.

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8. (New) The apparatus of claim 7, wherein the relation is further based on the following:

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$$\sum_{i=1}^{\alpha/2} [R_{C_{2i-1}, C_{2i}}(\tau) + R_{C_{2i}, C_{2i-1}}(\tau+1)] = \begin{cases} -\alpha \cdot 15, & \tau = 7 \\ \alpha, & \tau \neq 7 \end{cases}$$

where $\alpha = 2, 4, 6, 8$ and $R_{c_i, c_j}(\tau)$ represents a cross-correlation function between a pair of code sequences in each class, and $i \geq 1$.

9. (New) The apparatus of claim 7, wherein $2 \leq i \leq 8$.
